

OCCIDENTAL CHEMICAL CORPORATION
HOOKER/RUCO SUPERFUND SITE
HICKSVILLE, NEW YORK

OPERABLE UNIT 2
REMEDIAL DESIGN WORK PLAN

INTERMEDIATE SITE DESIGN SUBMITTAL

VOLUME IA OF II

Prepared For
Occidental Chemical Corporation
July 1991

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OCCIDENTAL CHEMICAL CORPORATION
PROJECT REA-91543-503
HOOKER/RUCO REMEDIATION PROJECT

SECTION 3: FIELD SAMPLING PLAN

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SECTION 3: FIELD SAMPLING PLAN
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SECTION 3

3.0 FIELD SAMPLING PLAN

3.1 Scope and Purpose

The scope and purpose of the Field Sampling Plan (FSP) is to define procedures that will be used to collect samples from Operable Unit 2 of the Hooker/Ruco site during the Remedial Action (RA). The FSP has been prepared following specifications described in A Compendium of Superfund Field Operations Methods, Office of Emergency and Remedial Response, USEPA, EPA/540/P-87/001, Verification of PCB Spill Clean-up by Sampling and Analysis, Office of Toxic Substances, USEPA, EPA-560/5-85-026, and Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup, Office of Toxic Substances, USEPA, EPA-560/5-86-017.

3.2 Project Description

A comprehensive description of the project's scope is presented in Section 2.0.

3.3 Project Organization and Responsibilities

3.3.1 Field Sampling Project Organization

Site Coordinator.	Dr. Alan Weston (OCC)
Project Manager	Mr. Joseph Coveney (OCC)
QA/QC Officer	Mr. Patrick Garrity (OCC)
Remedial Leader	Mr. William T. West (LBG)
Onsite Geologists	Mr. Keith Yocis (LBG)
	Mr. Stephen Ritz (LBG)
Health and Safety Officer . .	Mr. Douglas Paschke (OCC)
Sampling Coordinator.	Mr. William T. West

3.3.2 Definition of Responsibilities

Site Manager (SM): The SM is responsible for the successful execution of the work assignment. The SM shall implement and direct all sampling protocols required for the program. The SM shall determine the

sampling equipment and sample containers. The SM shall train and qualify field personnel in sampling procedures and field analytical procedures prior to sampling.

Onsite Geologist: All field personnel will report to the SM. The geologist will be required to be trained and qualified in all procedures of the FSP. The onsite geologists will perform all sample collection activities in accordance with the FSP and report any deviations in sample collection procedures to the SM.

Sample Coordinator: The sample coordinator is responsible for all sample handling and delivery of the collected samples to the analytical laboratory. The sample coordinator will ensure that samples are collected, labeled, preserved, stored and transported, as specified in accordance with the procedures or protocols. The sample coordinator will check that all sample documentation is correct and transmitted with the samples to the analytical laboratories. The sample coordinator will verify that all field analytical QC procedures are being followed.

3.4 Field Sampling Documentation

3.4.1 Field Books

Records of all sampling activities will be maintained and include field notebooks, scaled drawings, photographs and chain-of-custody forms. Field notebooks will be used to record pertinent observations, field measurements, and all sample collection procedures. Entries into the field books will be initialed for personnel identification and the date and time of all observations will be recorded. Entries will be made with waterproof ink and all field notebooks will be water resistant and weatherproof.

3.4.2 Field Measurements

All field measurements will be recorded in the field notebook. Sample locations will be clearly identified in the field notebook. The collection procedures, date and time of sample collection will be recorded in the field notebook. All field observations and climatic conditions during the sample event will also be recorded.

3.5 Air Monitoring - Real Time

Monitoring of the air quality in and around the work areas will be completed during remedial activities. Air monitoring will be conducted for total volatile organics and real-time particulates. Real-time monitoring indicates that readings are direct and immediate rather than requiring samples to be sent elsewhere from the site for analysis. Support activities, including backfilling, grading, soil transport and mobilization/demobilization will not require air monitoring.

3.5.1 Air Monitoring - Total Volatile Organics

Total volatile organic air monitoring will be completed using an HNU Model PI-101 PID or performance equivalent. PID instruments will be calibrated daily according to procedures presented in Appendix 3-1. Air monitoring for total volatile organics will be conducted prior to the start of remedial activities once each day, and once every two hours thereafter. Air monitoring for total volatile organics will be conducted from one upwind and three downwind locations at the perimeter of the active work areas. Specific monitoring locations will be determined based upon readings collected from an onsite wind gauge, and will be selected by the site manager. Air monitoring will be conducted at respirable height, approximately 4 to 6 feet above grade.

3.5.2 Air Monitoring - Real-Time Particulates

Air monitoring for real-time particulates will be completed using a GCA Miniram aerosol monitor or performance equivalent. The real-time monitoring unit will be calibrated daily according to procedures presented in Appendix 3-2. Real-time particulate levels will be monitored continuously at each active work area. Particulate levels will be recorded in the field notebook on an hourly basis, and more frequently during periods of wind gusts. Air monitoring for real-time particulates will be collected at specific upwind and downwind locations at respirable heights, approximately 4 to 6 feet above grade.

Remedial project work zones for this project are those specified in Section 5.9.1 of the HASP.

3.5.3 Air Monitoring - Confined Space

Air monitoring for total volatile organics, oxygen and flammability will be conducted during confined space activities. Work in confined space is anticipated to occur only in the deeper excavation in the Direct Spill Area. Confined space air monitoring will be used in conjunction with the Confined Space Entry Plan described in the HASP. All confined space air monitoring will be conducted continuously before and during the confined space activities. Total volatile organics will be monitored using a calibrated PID. Oxygen and flammability measurements will be collected using a MSA Model 260 portable combustible gas and oxygen alarm or performance equivalent. The combustible gas alarm will be set at a 25-percent Lower Explosion Limit (LEL) and the oxygen alarm will be set at 19.5 percent. The unit will be calibrated daily before use according to procedures presented in Appendix 3-3.

3.6 Air Sampling - Time-Weighted Average

Air sampling will be conducted for particulates and Aroclor 1248 on particulates during the remedial activities. Air sampling will be completed once prior to commencement of the field work and weekly during all excavation activities. Air sampling will not be completed during backfill, grading and reseeding operations, soil handling activities and mobilization/demobilization. The exact sampling locations will be selected daily by the SM and will be determined using an onsite wind gauge. Air sampling will be collected from one upwind and two downwind locations at the perimeter of the active work zones. Air sampling will be conducted at a respirable height (4 to 6 feet above grade) according to NIOSH methods. Onsite field measurements of windspeed, direction and relative humidity will be collected prior to sampling, and then every 4 hours thereafter. Field measurements will be augmented with meteorological data obtained from the Republic Airport at Farmingdale, New York. Information on meteorological data from Republic Airport will be collected daily prior to sampling by contacting the air tower at (516) 683-2916. All relevant air monitoring data will be recorded on the work sheets attached in Appendix 3-4, each time air sampling is completed.

3.6.1 Air Sampling - Particulates

Air monitoring for total particulates will be conducted utilizing a flow-controlled personal sampling pump and a tarred 37 mm, 5 um PVC filter, as described in NIOSH Method 0500. The personal sampling pump will be a DuPont ALPHA-1 air sampler or performance equivalent. The ALPHA-1 pumps are user programmable for start time, run time, tolerated low-flow time, and intermittent run time. User flow rates are selectable from 5 cc/min to 5,000 cc/min without requiring the use of critical orifices. The pumps will be

used at a flow rate of 1,500 to 2,000 cc/min, as specified in NIOSH Method 0500.

Collection filters utilized for particulate sampling will be SKC 37 mm, 5 um pore size, PVC filters, or performance equivalent, and will meet the requirements of NIOSH Method 0500.

Collection filters for the measurement of total particulates will be gravimetrically analyzed for total mass according to NIOSH Method 0500. The filters will be pre-numbered, desiccated and weighed on a microbalance capable of weighing to 0.01 mg. The filters will then be used for collection, desiccated again and re-weighed. The resulting change in weight will be calculated and the concentration in mg/m^3 will be reported.

Air sampling for particulates and specific pump calibration will be completed with procedures outlined in Appendix 3-4.

3.6.2 Air Sampling - Aroclor 1248 on Particulates

The analysis for Aroclor 1248 on particulates will be conducted utilizing a flow-controlled air sampling pump, as described in NIOSH Method 5503. The air sampling pump will be a DuPont ALPHA-1 air sampler or performance equivalent. The ALPHA-1 pumps are user programmable for start time, run time, tolerated low-flow time, and intermittent run time, as well as user flow rate selectable from 5 cc/min to 5,000 cc/min without requiring the use of critical orifices. The pumps will be used at flow rates between 500 and 1,000 cc/min for NIOSH Method 5503. They will be calibrated for flow rate utilizing a Teledyne-Hastings NBS traceable bubble meter or performance equivalent.

Hexane will be used to desorb chemicals from the glass fiber filters. The analysis will employ a gas chromatograph equipped with an electron-capture detector. The following

chemical will be analyzed for: Aroclor 1248. Concentrations above 0.01 mg/m³ will be reported.

Glass fiber filters utilized for Aroclor 1248 on particulates air sampling will be 13 mm glass fiber filters, or equivalent, and meet the requirements of NIOSH Method 5503.

QA/QC will consist of analysis of a field blank which will be an unopened filter taken into the field and returned to the laboratory for analysis. Desorption efficiency will also be determined by spiking Aroclor 1248 onto the filter media and desorbing according to NIOSH Method 5503.

Air sampling for Aroclor 1248 on particulates and specific equipment calibration will be completed with procedures outlined in Appendix 3-4.

3.7 Waste Classification Sampling

All soil and sediment waste generated during the remedial project and liquid waste from onsite decon procedures will be characterized in accordance with 40 CFR Part 261 and 6NYCCR Part 371, regulations concerning the identification and definition of hazardous waste. All waste classification samples will be subjected to analytical testing for ignitability, reactivity, corrosivity and the TCLP Test Method 1311 for toxicity. A summary of the testing procedures and regulatory levels are presented on table 1.

By definition, all solid waste containing 50 ppm or greater PCBs is listed hazardous waste. A portion of the excavated soils will contain concentrations of PCBs that, if tested, would be determined to be hazardous waste. Therefore, knowledge of the excavated soils will be used, rather than subject the soils to additional testing. Pursuant to 6NYCRR 371.4(e), the hazardous code for PCB wastes will be toxic (T). All excavated soils during the remedial project will have the following hazardous waste number assigned to the solid material:

B007: Other PCB wastes, including contaminated soil, solids, sludges, clothing, rags and dredged material.

3.7.1 Soil and Sediment Waste

As described in Section 2.0, soils that have been excavated will be stored onsite in containerized gondola rail cars. The waste material will be stored in the rail cars and separated by source location. One representative composite soil sample from the work areas containing 10 to 500 ppm of PCBs will be collected and submitted for analytical testing of the waste characterization parameters prior to the start of excavation. Soil sample for characterization and pre-qualifying the waste will be collected from the following sources:

- direct spill area;
- Sump 3;
- transported-related areas (Work Areas A through I); and
- stockpiled soils.

3.7.2 Liquid Waste

The remedial project will not involve the removal of either standing water or ground water. However, small quantities of liquid waste may be generated during the equipment or personnel decontamination procedures. During equipment or personnel decontamination, small volumes of water will be sprayed and contained. This liquid will be drummed and contained by source. Each specific waste stream (equipment decontamination, personnel decontamination) will be sampled separately, and one composite sample of each waste stream will be collected. The liquid samples will be tested for waste characterization parameters.

The liquid waste samples will be collected using the following procedure. The liquid waste drums will be opened and a clear bailer will be lowered to the base of each drum. After the bailer has been lowered to the base of the drum, it will be removed and visually inspected to determine if non-aqueous phase liquids (NAPLs) are present. If NAPLs are detected in any of the drums, two separate samples of the NAPLs will be collected. The NAPL sample collection will be completed using a bottom-loading bailer to prevent dilution of the NAPL samples. It should be noted, however, that NAPLs have never been encountered at the Hooker/Ruco site and are not expected to be found during the liquid waste sampling. If NAPLs are not encountered during the sample acquisition, one bailer from each drum of a distinct waste stream will be removed and placed in a 5-gallon nalgene container. The container will remain sealed between each sample acquisition. After all drums of a distinct waste stream have been sampled and composited, a sample of the composite water from each waste stream will be collected and submitted for testing. The drummed liquid waste will be resealed and remain on the Hooker/Ruco site until review of the laboratory data is completed.

3.7.3 Solid Waste

Solid waste consisting of decontamination rags used to swab equipment and non-porous surfaces and spent protective equipment will be containerized in sealable 55-gallon drums. Because the spent rags and protective equipment have been in direct contact with PCB articles/materials, knowledge of the waste will be used for disposal purposes. The solid waste will not be subjected to testing, but rather classified as hazardous waste based upon toxicity and be assigned hazardous waste number B007. The solid waste will be disposed of as hazardous waste with the soils containing PCBs between 10 and 500 ppm.

3.8 Verification Sampling

Work areas will be excavated to the desired target depth, as described in Section 2.0. Soil samples will then be collected from the excavated areas, beneath the stockpiled soils and the sides and base of Sump 3. The sample locations in each cleared area will be based upon a hexagonal grid configuration. Soil samples will be collected at each grid location and the verification samples will then be composited prior to analysis. All verification samples will be submitted to the receiving laboratory for analysis of PCBs by Method 8080. The post-excavation (verification) sample results will be used to assess the effectiveness of the remedial activities in achieving the performance standards.

The steps necessary to complete the verification sampling are presented below:

- Step 1 - Document the excavation/sample area.
- Step 2 - Determine the center and radius of the sample area.
- Step 3 - Determine the number of sample points.
- Step 4 - Construct the sample grid.
- Step 5 - Consider judgmental samples.
- Step 6 - Collect the verification samples.
- Step 7 - Composite the verification samples.

The following paragraphs provide narrative descriptions and describe the procedures to be employed to complete each step.

3.8.1 Step 1 - Document the Excavation/Sample Area

Each area to be sampled will be diagrammed. Both side and plan view scaled drawings of the sample area will be completed. All vertical surfaces, excavation dimensions and surface types will be identified on the diagrams. All excavation boundaries will be referenced by measured distance

to stationary objects and these reference points will be included on the drawings.

In addition to the scaled drawings, a minimum of one photograph of each sample area will be obtained. An appropriate scale, which can be used to reference sample area dimensions will be included in the photograph. A reference card containing the sample area's identification, site name and date will be included in the photographic record. The date, time and photograph number will be recorded in the field book.

3.8.2 Step 2 - Determining the Center and Radius of the Sample Grid

The shape and size of each sample area will be unique and will be different than other sample areas. The grid design that will be used to locate sample points will also be unique and tailored to each sample area. The sample grid will be determined for each area to be sampled using standard geometric techniques. The center and radius calculations will be determined from the one-dimensional plan view of the sample area completed in Step 1. The center and radius will be calculated according to procedures presented in Appendix 3-5. All dimensions will be computed and recorded to the nearest 10th of a foot.

3.8.3 Step 3 - Determine the Number of Sample Points

The sample area's size will govern the number of soil samples that will be collected. The sample area's size shall be determined and classified using the sample radius' length. Based upon the hexagonal grid configuration, sample grids will be of 7, 19 or 37 points in size. Figure 3-1 shows the proposed hexagonal sampling gride for verification sampling. Table 1 presents the sample area's size and the associated number of samples.

Sample radius (in feet)	Number of sample points
<10	7
>10 <30	19
>30	37

No more than 37 sample points will be plotted for a given sample area, excluding the judgmental sample locations described in Step 5.

3.8.4 Step 4 - Construction of the Sample Grid

Based upon the results of Step 3, the appropriate grid will be constructed in the sample area. The sample area's center will be determined and staked in the field following the procedures that were used in Step 2. The sample area's surface will be covered with plastic sheeting prior to completing measuring and grid construction activities. The sample grid will be constructed in the field according to procedures presented in Appendix 3-6. Actual sample locations will be staked with flagging and measured from a minimum of two stationary objects. Field measurements will be recorded in a coordinate table and also presented on a scaled drawing of the sample area.

3.8.5 Step 5 - Consider Special Case Sample Locations

After the grid sample design has been constructed, additional samples of suspect areas will be considered. The judgmental sample locations will be collected in addition to the sample grid when staining, visible oils or suspicious areas, including cracks and crevices, are located adjacent to, but beyond the sample area. As with all sample locations, the judgmental sample locations will be measured from at least two stationary objects and also presented on the scaled drawing of the sample area.

3.8.6 Step 6 - Verification Sample Collection

After the sample grid has been constructed on the site, a sample will be collected at each grid point. Soil samples for verification purposes will be collected according to procedures presented in Appendix 3-7. Samples, however, will not be collected from grid locations when any sample point meets one or more of the following conditions:

- A. The sample point is located in an adjacent work area that has been excavated and determined compliant.
- B. The sample point is located in an adjacent work area that has not been excavated.
- C. The sample point is located on a vertical surface between work areas that have not been excavated.
- D. The sample point, located on the scaled drawing, does not exist in the actual sample area.
- E. The sample point is located on a vertical surface of a site building or utility.

During sample collection activities, all pertinent data, including time, date, sample, personnel, sample methods, and other collection data, will be recorded in the field books.

3.8.7 Step 7 - Compositing Strategies

Samples collected from the verification grid locations will be composited prior to analysis. Procedures for the composite soil samples are presented in Appendix 3-8. Composite soil samples will be formed from 5 samples or less to prevent diluting a batched sample below the analytical quantification limits. Composite soil samples will be formed

from roughly equal number of soil samples from adjacent sample points. Figure 3-2 presents compositing strategies for the various verification sampling grids. Composite samples will be analyzed for Aroclor 1248 by Method 8080.

3.9 Results Evaluation - Compliance/Non-Compliance of Verification Samples

The objective of the verification sampling program is to determine if remedial actions have been effective in removing impacted soils having PCB concentrations above the performance standard of 10 ppm. The PCB concentration in a single soil sample, therefore, would be the target cleanup level of 10 ppm. Single soil samples analyzed and found to have PCB concentrations equal to or greater than 10 ppm will be considered to be above the performance standards, and PCB concentrations less than 10 ppm will be determined to be in accordance with performance standards.

Composite soil samples will be addressed similarly. PCB concentrations in the composite sample will be a result of the average concentration of all pooled samples. The composite sample concentration will be reviewed with respect to the statistical cutoff level of 10 ppm. If the results of the composite sample are at concentrations equal to or greater than 10 ppm, then at least one, if not more of the samples will have exceeded the compliance limit. However, if the resulting concentration is less than $10 \text{ ppm}/N$, where N equals the number of samples pooled to create the composite, not to exceed 5 samples, then all soil samples in the composite meet the remedial objectives. If the composite concentration results in some medium value, each sample used to form the composite will be analyzed individually to reach a decision.

If a reading in excess of 10 ppm is obtained by either the single sample analysis or the composite approach, the location of the sample or samples will be re-excavated to a limit of the radius of the smallest circle certain to be

sampled. The following table presents the procedure to be used to determine the smallest circle certain to be sampled:

Number of points	Radius of smallest circle certain to be sampled
7	0.5R
19	0.28R
37	0.19R

where R is the sample grid's radius, as determined by methods presented in Appendix 3-5

The re-excavation will be completed in 1-foot lifts or at depth increments to be determined in the field. Re-sampling to confirm that the remedial objective has been achieved will be completed.

3.10 Confirmation Sampling

During the verification sampling process, sufficient quantities of soil will be collected from the individual sample locations to form duplicate composites. One of the composite samples will be analyzed rapidly for verification purposes. Once the verification sampling results show that the remedial action performance standards have been achieved, the duplicate composite soil sample will be submitted for analytical testing. One duplicate composite soil sample from each sample area will be submitted for confirmation analysis of Aroclor 1248 using CLP methodologies.

3.11 Sample Equipment Cleaning

In order to minimize the potential for cross contamination during sample collection activities, disposable sample equipment will be used for verification sampling. Disposable equipment will include stainless-steel spoons/spatulas/trowels, Teflon sheets and disposable templates. However, should disposable soil sample equipment

not be available, sample equipment will be cleaned between sample collections. The sample equipment cleaning procedures are presented in Appendix 3-9.

3.12 Field and Equipment Blanks

Air sampling field blanks will be collected at a rate of one field blank per lot of air sampling filters. Air sampling blanks will only be assessed for Aroclor 1248. Air sampling field blanks will consist of an unopened filter taken into the field and returned to the laboratory for analysis. Desorption efficiency will also be determined for the field blank by spiking Aroclor 1248 onto the filter media and describing according to NIOSH Method 5503.

Field and equipment blanks will be collected during the investigation. One field blank will be collected for each type of sampling equipment used each day. Field and equipment blanks of the sample and excavation equipment will be collected by wipe sampling the surface. Wipe sampling will be completed by procedures presented in Appendix 3-10. Field and equipment blanks collected to assess sampling and remedial equipment quality will be analyzed for Aroclor 1248 by Method 8080. Equipment blanks will be collected from each type of excavation equipment used during the remediation; examples of equipment blanks include shovel blades used during hand excavation, backhoe or front-end loader buckets, and crane buckets.

3.13 Duplicates

Duplicate air samples will be collected at a rate of one duplicate per each sampling event. The air sampling duplicate will be collected from a downwind sampling location. Duplicate soil samples will be collected at a rate of 10 percent during the verification sampling process. Duplicate samples from the composite sampling procedures

will be collected at a rate of 1 per each sampled area. All duplicate soil samples will be blind coded.

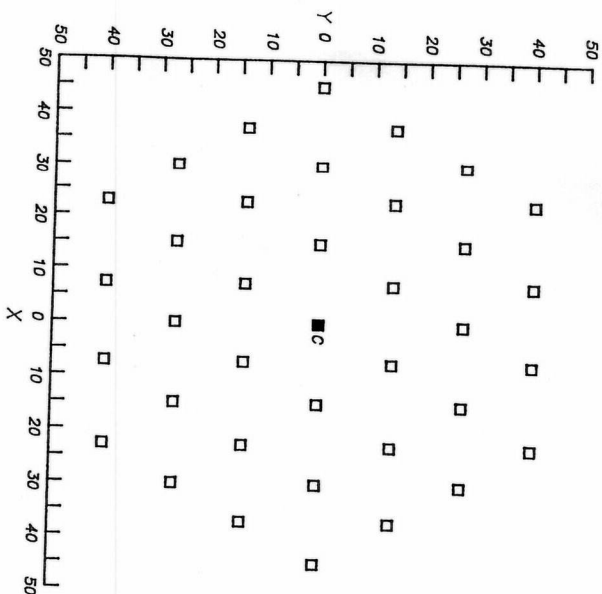
3.14 Containers

Three hundred (300) series containers will be obtained from I-Chem Research, Hayward, California, or performance equivalents. Appropriate sample containers for the various samples presented in Section 4.0 QAPP.

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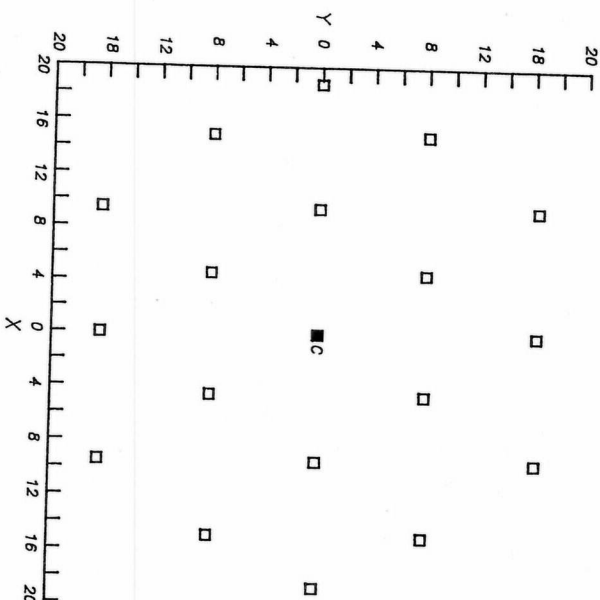
FIGURE 3-1

LOCATION OF SAMPLING POINTS IN A 37-POINT GRID



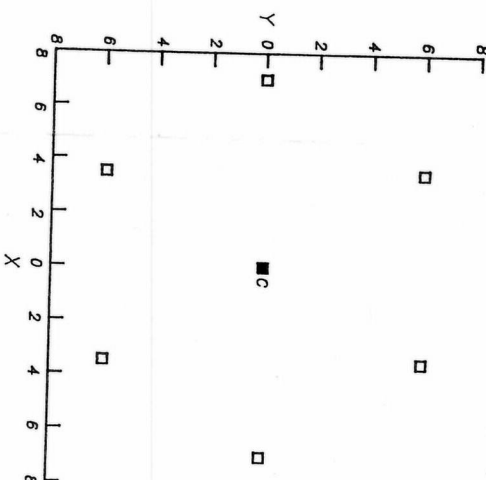
THE OUTER BODY OF THE SAMPLE AREA IS ASSUMED TO BE 50 FEET FROM THE CENTER (C) OF THE SPILL SITE.

LOCATION OF SAMPLING POINTS IN A 19-POINT GRID



THE OUTER BODY OF THE SAMPLE AREA IS ASSUMED TO BE 20 FEET FROM THE CENTER (C) OF THE SPILL SITE.

LOCATION OF SAMPLING POINTS IN A 7-POINT GRID



THE OUTER BODY OF THE SAMPLE AREA IS ASSUMED TO BE 8 FEET FROM THE CENTER (C) OF THE SPILL SITE.

**OCCIDENTAL CHEMICAL CORPORATION
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**HEXAGON SAMPLE GRIDS FOR
THE VERIFICATION SAMPLING**

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		FIGURE: 3-1